

The Times-Picayune

WorldCom slapped with SEC fraud charges

Bankruptcy looms for debt-ridden firm

By Simon Romero
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The Securities and Exchange Commission filed federal fraud charges against WorldCom on Wednesday and President Bush vowed to "hold people accountable" for the bookkeeping scandal at the company, the nation's second-largest long-distance provider and a major carrier of Internet traffic.

As the stock market shuddered Wednesday in response to Tuesday night's disclosure that WorldCom had falsely reported profits for the past five quarters, the Nasdaq exchange suspended trading of shares in WorldCom and the tracking stock of its MCI unit. And as the value of WorldCom's corporate bonds plummeted, it became clear that the debt-ridden company would now face tougher negotiations with its bank lenders, making a bankruptcy filing more likely.

Meanwhile, the Justice Department and a crucial House committee opened investigations of the company's accounting methods and the SEC said it would expand its own investigation, which it began in March.

And as the company's work force braced for a wave of pink slips — WorldCom plans to cut 17,000 of its 85,000 employees starting Friday — some consumer and corporate customers of WorldCom's MCI long-distance unit were already looking for other carriers.

Few telecommunications companies looked like havens Wednesday, though, as WorldCom's bad news helped batter stocks of other carriers in this country and overseas, which have already been struggling to emerge from the communications industry's long recession.

"The industry is reeling from this black mark," said Jose Col-

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► **Another fallen exec once considered model of credibility, A-7**
► **List of companies mired in scandal likely to grow, see Money**

Washing away
How south Louisiana is growing more vulnerable to a catastrophic hurricane
PART FIVE OF A FIVE-PART SERIES

Cost of survival

New Orleans and south Louisiana will always be vulnerable to a catastrophic hurricane, yet there are ways to make the area safer. But implementing the proposals may be prohibitively expensive.



COASTAL RESTORATION



LEVEE IMPROVEMENTS



DIVIDING WALL

STAFF PHOTOS BY ELLIS LUCIA AND TED JACKSON

One way to increase protection against storms is to repair coastal buffer areas, such as Breton Island, TOP. Another strategy is to improve the levee system, with projects like the Good Hope flood gate in St. Charles Parish, CENTER. Finally, there are more drastic ideas, such as a wall bisecting Orleans and Jefferson parishes to create a safe haven, similar to the wall protecting Morgan City from the Atchafalaya.

Stories by John McQuaid and Mark Schleifstein Staff writers

IF hurricanes haven't seriously scarred coastal Louisiana or swept it out to sea in the next 50 to 100 years, the very process of protecting the region may still end up altering it almost beyond recognition.

Based on current plans and proposals, here are some changes that coming generations may see: ► A giant wall, more than 30 feet high in places, cuts through New Orleans and across Jefferson Parish to create a "safe haven" should a storm surge from Lake Pontchartrain top the levees. The

levees themselves are 10 feet or more higher than today, and some are crowned with a sea wall, blocking views of the lake. A large collapsible wall sits atop some levees, ready to be raised during hurricanes.

► At the Rigolets and Chef Menteur passes to the lake, huge floodgates stand ready to be closed if waters rise. All across the Mississippi River delta, hurricane levees crisscross marshes, surrounding dozens of towns. At key junctures on the river, large

See **PREVENTION**, A-16

INSIDE

ADVANCE WARNING

With every advance in the science of hurricane forecasting, more lives are saved. **SEE A-16**

COASTAL RESUSCITATION

One of the most ambitious projects ever conceived would breathe new life into Louisiana's wetlands. **SEE A-18**

AHEAD OF THE STORM

The key to surviving a major storm is to leave. But first, have a plan. **SEE A-19**

'I pledge allegiance to the flag of the United States of America and to the republic for which it stands, one nation, under God, indivisible, with liberty and justice for all.'

In 1954, Congress added 'under God.' An appeals court ruled Wednesday that those words violate separation of church and state provisions of the Constitution.

Court rules against Pledge of Allegiance

Lawmakers vow to fight decision that could ban school recitations

By Charles Lane
The Washington Post

The Pledge of Allegiance, recited by millions of American children at the start of each school day, is unconstitutional because it describes the United States as "one nation, under God," a federal appeals court ruled Wednesday.

A three-judge panel of the 9th U.S. Circuit Court of Appeals based in San Francisco ruled 2-1 that the reference to God, which was added to the pledge by Congress in 1954, amounts to an official endorsement of monotheism. Thus, the court said, both the 1954 law and a California school district policy requiring teachers to lead children in the pledge violate the First Amendment prohibition against the establishment of a state religion.

If the ruling stands, schoolchildren could no longer recite the pledge, at least in the nine Western states covered by the court.

"A profession that we are a nation 'under God' is identical ... to a profession that we are a nation 'under Jesus,' a nation 'under Vishnu,' a nation 'under Zeus,' or a nation 'under no god,' because none of these professions can be neutral with respect to religion," Judge Alfred Goodwin, an appointee of President Nixon serving as a senior judge, wrote for the three-judge panel. Goodwin was joined by Stephen Reinhardt, an appointee of President Carter.

See **PLEDGE**, A-8

► **The history of the pledge, A-8**

Officials push drug benefit for seniors

But Congress is still as divided as ever about plan's specifics

By Bruce Alpert
Washington bureau

WASHINGTON — Dozens of House members from both parties are stepping up to the microphone this week to declare their support for a prescription drug benefit for senior citizens.

That is hardly surprising.

At constituent meetings across the country, the issue is raised regularly as seniors tell lawmakers that the cost of prescriptions is overwhelming their fixed incomes. Many members say they've heard poignant pleas from seniors forced to skip meals or dilute their prescribed daily dose of medicine to keep costs down.

According to the Kaiser Family Foundation, Medicare recipients pay an average of \$1,051 a year out of their own pockets for prescriptions, up

See **PRESCRIPTIONS**, A-10

World changed, and so did Bush speech

By Robin Wright and Tracy Wilkinson
Los Angeles Times

WASHINGTON — The speech was drafted, redrafted and then worked over again and again — 28 times in all before President Bush finally delivered his vision for achieving peace in the Middle East.

The drafts varied widely. Version 11 opened with a dramatic — some officials later called it inflammatory — description of a young girl in a Jewish settlement hunted down and killed by a Palestinian gunman. U.S. diplomats in the Middle East urgently pressed for changes to the anecdote. Revisions were

See **SPEECH**, A-10



AP PHOTO

HATCHET JOB

A fire crew cools a hot tree stump Wednesday near Show Low, Ariz. 'We have to emphasize that Mother Nature is still in control,' fire spokesman Jim Paxon said. 'But we're on the scoreboard. ... We're making some progress.'

See **story**, A-12

Advance warning

Improvements in forecasting have greatly reduced storm casualties. Now, scientists are developing techniques that could save more lives by improving hurricane warnings and evacuation times critical for New Orleans.

By John McQuaid and Mark Schlieffstein
Staff writers

VIRGINIA KEY, FLA.

THE best example of the importance of accurate hurricane forecasting may be found in the wreckage of its worst failure.

At least 8,000 people died in Galveston, Texas, in September 1900, primarily because weather officials didn't recognize the powerful dynamics of the storm and failed to warn residents until it was too late.

The thriving Gulf Coast seaport was devastated. Homes and businesses were flattened. Bodies floated in Galveston Bay for days. Scientists were forced to re-examine their theories about the storms and the way that warnings were issued.

Fifteen years later, U.S. Weather Bureau forecaster Isaac Cline, the man who had failed to alert Galveston, was able to warn the Louisiana coast a day before an equally strong hurricane hit New Orleans, likely saving thousands of lives.

The period after the Galveston disaster marked the beginning of a century of scientific and technological advancements in hurricane forecasting that first and foremost saved lives. During the first 30 years of the 20th century, the average annual loss of life in U.S. hurricanes was 329. During the next 40 years, the average number of deaths dropped to 70 a year, and since 1969 the average has fallen to fewer than 20.

"Hurricane research is one of the successes of the 20th century," said Hugh Willoughby, director of the Hurricane Research Division, the nation's hurricane research think tank on Virginia Key, a small island sandwiched between Miami Beach and the Miami-Dade County mainland.

Pinpointing storm's swath

But scientists admit they still don't understand many things about hurricanes. The giant storms are steered by complicated weather patterns that not even the most powerful computers can predict with certainty. The storms also can weaken or strengthen suddenly in ways that scientists have not yet been able to anticipate.

Perhaps most crucial, the advances in better and earlier warnings have been offset by the explosion in coastal population and the increase in the amount of time it takes to get these new coastal residents out of harm's way. The New Orleans area, for example, needs at least 72 hours to evacuate all its residents. Hurricane forecasting has not been refined enough to meet that kind of time frame.

Three days before a hurricane hits, the official forecast can be off by as much as 250 miles in either direction. That is a dramatic improvement from the 520-mile error rate of 30 years ago, but still a wide area for making the expensive decision to shut down a city. Even 24 hours in advance, the average forecast error is about 85 miles, meaning 170 miles of coastline or more may get hurricane warnings, according to Max Mayfield, director of the National Hurricane Center.

Until more progress is made, warnings will continue to be a two-edged sword: They save lives and reduce property damage in the part of the warning area where the hurri-

cane hits, but they also can result in expensive false alarms that may hinder the credibility of future warnings.

When Hurricane Floyd approached the U.S. coast in September 1999, forecasters were forced to put almost the entire eastern coastline under an escalating series of watches and warnings. About 2 million people from Florida to Delaware evacuated their homes. The evacuation may have cost as much as \$2 billion in direct expenses and lost business revenue.

Forecasters are optimistic about their ability to reduce forecasting errors and predict more accurate tracks and intensities days in advance. Improvements in computer models and in the data going into them can continue to reduce error rates over the next 30 years, Willoughby said.

But intrinsic limits can defeat even the most sophisticated models. Chaotic behavior in the atmosphere will eventually limit the ability of forecasters to improve that accuracy beyond a certain level, Willoughby said.

"Chaos" is a mathematical term referring to dramatic shifts and cycles that can appear random. Chaotic behavior can be almost impossible to predict, like figuring out the effect of a butterfly's wings on prevailing winds. In the case of the atmosphere, fluctuations in temperature, pressure or wind speed that start out small can unexpectedly grow, confounding forecasters.

"Chaos theory has a big effect on error," Willoughby said. "The atmosphere is an unevenly heated, rotating flow of gas. Changes happen on a scale too small to observe. That's why we will eventually get to that point where we're making a forecast that doesn't get any better."

At the point that limit is reached, he said, scientists hope the forecasts will be in the range of a 30-mile error at 24 hours, 60 miles at 48 hours and 90 miles at 72 hours.

Scientists have a promising technique that can help them sort out both chaotic effects and inaccuracies in computer models. By running an "ensemble" of different forecast models and comparing the results against weather data, they can see how errors in each model diverge from reality and adjust them accordingly the next time out.

A "superensemble" of 12 models devised by Florida State University scientists correctly predicted the landfall of Hurricane Floyd four days in advance in 1999. Florida State atmospheric scientist Tiruvallam Krishnamurti said that the technique doesn't always produce such accurate results, but said it could cut current errors by close to half.

Finite pool of research cash
The errors might be shrinking faster if it weren't for budget woes at the National Weather Service, forecasters say. Annual financing for Willoughby's research division was stuck at \$2.6 million from 1982 to 1999 and has received only minor increases since, officials said, affecting basic research into hurricane movements and intensity that would help reduce forecast error.

Officials say hurricane research is forced to compete for scarce dollars with basic research into global climate change, tornadoes, forecasting of weather systems that affect commercial aircraft, volcanoes and earthquakes. Nevertheless, the Hurricane Research Division has made progress

WASHING AWAY

1743 •

Benjamin Franklin makes

some early observations

about the movements of hurricanes after his efforts to view a lunar eclipse are obscured by the edge of a storm.

1830 •

Amateur scientist William Redfield publishes a paper outlining a hurricane's circular motion. He bases his findings on the observation that a hurricane that hit Connecticut knocked down trees in one direction in the eastern part of the state and in the opposite direction in the west.

1849 •

The Smithsonian Institution establishes an extensive weather observation network using the telegraph.

1870 •

The U.S. Army Signal Corps operates the first federal weather service, taking observations at 22 locations and issuing "forecasts."

1873 •

The Army Signal Corps issues its first hurricane warning, for a storm approaching the East Coast north of Cape May, N.J. The storm doesn't make landfall.

1877 •

The Rev. Benito Vines, director of the meteorological observatory of the Royal College of Belem in Havana establishes the first hurricane-reporting service, which eventually includes much of the Caribbean, and publishes a book on how to predict hurricanes by observing cloud formations.

1890 •

Congress creates the Weather Bureau in the Department of Agriculture.

1898 •

President McKinley orders the Weather Bureau to establish a hurricane-warning network.

1904 •

Airplanes are used to conduct upper-air atmospheric research.

1909 •

The Weather Bureau begins experiments with balloon observations. Ships use radio to report hurricane positions.

1920 •

Isaac Cline's study of storm tides is published in the U.S. Monthly Weather Review. For the first time, it identifies the right-front quadrant of a hurricane as the location of the highest storm surge.

1926 •

Isaac Cline publishes "Tropical Cyclones," the first major scientific work about hurricanes.

1935 •

Hurricane forecast centers are established in Jacksonville, Fla.; New Orleans; Boston; and San Juan, Puerto Rico.

1937 •

Weather Bureau for the first time uses the radiosonde, a balloon-borne instrument platform, ending the use of aircraft for regular soundings.



1940 •

The Weather Bureau is transferred from the Agriculture Department to the Department of Commerce.

1943 •

On July 23, the Army Air Force's Col. Joseph Duckworth and 2nd Lt. Ralph O'Hair become the first people to fly through a hurricane, the result of a bet with a British aviator.

1943 •

In September, Army radar in Orlando, Fla., tracks the progress of a hurricane.

1944 •

The Navy and Army Air Force fly the first reconnaissance missions into tropical cyclones in the Atlantic and Pacific oceans. The location of the Atlantic aircraft in Miami results in it becoming the predominant national hurricane forecast center.

1948 •

The first primitive computer numerical forecasts are made on the Electronic Numerical Integrator and Computer, ENIAC.

1950 •

Forecasters begin giving names to hurricanes. The first names are the phonetic alphabet used by the military: Able, Baker, Charlie, Dog, Easy, Fox, etc.

1953 •

Forecasters begin giving tropical storms female names.

1954 •

The first radar specifically designed for meteorological use is put in service by the Air Force.

1955 •

The Weather Bureau begins development of the barotropic computer model, a numerical weather prediction tool using observations from the surface and aloft to simulate the atmosphere.

1959 •

The first weather surveillance radar is commissioned at the Miami hurricane forecast center.

1960 •

TIROS 1, the world's first weather satellite, is launched.

1961 •

The first experiment in seeding a hurricane to reduce its strength takes place. Ten years later, the program is abandoned as ineffective.

1967 •

The Weather Bureau is renamed the National Weather Service.

1972 •

CLIPER, a simple computer model that predicts hurricane paths based on historical tracks, is created.

1975 •

The first geostationary weather satellite, GOES 1, is launched. Rotating at the same speed as the Earth, the satellite seems to stay in one place, allowing continuous monitoring of hurricanes.



ISAAC CLINE •

Blamed by some for failing to alert Galveston in 1900 to the hurricane that would claim the lives of about 8,000 people, Isaac Cline was later transferred to New Orleans. In 1915, he warned Louisianians a day before an equally strong hurricane hit New Orleans, likely saving thousands. He later published several influential papers on hurricanes.

1975 •

Meteorologists Herbert Saffir and Robert Simpson develop the Saffir-Simpson scale for measuring hurricanes. The scale gives an estimate of the potential property damage and flooding expected along the coast from a hurricane landfall.

1979 •

Weather officials begin using male names for hurricanes

1981 •

Aviation and medium-range forecast models established. They are used to develop three-day forecasts of low-pressure systems, including hurricanes, off the East Coast.

1983 •

Doppler radar installed in tail of P-3 Orion hurricane research planes allows 3-D mapping of the internal workings of hurricanes.

1990 •

The National Weather Service begins switching to new Doppler radars that let forecasters measure rainfall, identify wind direction, and better recognize tornadoes and other weather anomalies.

1991 •

The National Weather Service begins installing the Automated Surface Observation System throughout the nation. Automated stations report on sky conditions, visibility, type and intensity of precipitation, sea-level pressure, temperature, and wind speed and direction.

1993 •

The Statistical Hurricane Intensity Prediction Scheme, or SHIPS, model becomes operational, resulting in a better understanding of how hurricanes intensify and weaken.



NOAA PHOTO



SMITHSONIAN INSTITUTION

1996 • New dropsonde instrument packages equipped with satellite-positioning devices help forecasters recognize that wind speeds in hurricanes may be much higher than expected 500 feet above the ground, resulting in abandonment of "vertical refuge" plans to use high-rise buildings as shelters in many locations.

1999 • Florida State University tests "superensemble" of many hurricane forecasting models to reduce bias and improve accuracy.
Source: Staff research

BACKGROUND

WEATHER BALLOONS • Beginning in 1909, the weather bureau began gathering storm data using balloons, seen here in the '20s. The balloons began carrying radio and sophisticated instruments in 1937. Today, similar equipment is still used in balloons to measure atmospheric pressure, temperature, and relative humidity.

Studies in recent years have linked the loop current to the rapid intensification of several storms, including Hurricane Opal, whose winds jumped from 100 mph to 150 mph in just 18 hours, and then dropped back to 110 mph just before it went ashore in the Florida panhandle in October 1995.

Models were inaccurate because they relied on surface-water temperature measurements made by satellites. "If you look at the satellite pictures, you can't see the eddies. You can't see the deeper, warm water," Willoughby said.

To solve the problem, Willoughby is making use of military castoffs. For years the Navy has used instruments called bathythermographs, which measure water temperature at different depths, to correct sonar readings used to hunt for enemy submarines. Now they're also being used to determine the location and size of the loop current near the Louisiana coast.

National Hurricane Center director Mayfield said he's concerned that the focus on the warm eddies may be too simplistic to

explain the rapid deepening. "We've had a lot of hurricanes going over the loop current that didn't develop rapidly," Mayfield said. "It's just not that easy."

The answer may be to improve instruments to allow the sampling of the atmosphere in three dimensions by aircraft flying through hurricane cores, he said.

Researchers also are fine-tuning models to give more information about the amount of rainfall accompanying hurricanes and tropical storms. Knowing how much rain will fall could be a major help for communities such as New Orleans and Jefferson Parish, where neighborhoods quickly fill with rainwater and drainage pumps have a limited capacity to pump it away.

"Most of the people that die in hurricanes drown in fresh water," Willoughby said, the result of inland flooding caused by a hurricane's torrential rains. "So we need to predict rainfall."

"The average hurricane dumps 100 inches of rain in its lifetime, all in one spot

WASHING AWAY

From weather vanes to weather radar, the science of meteorology has come a long way in the past hundred years. Today, satellites and sophisticated software are giving scientists even more insight into the complexities of hurricanes.



NOAA PHOTO

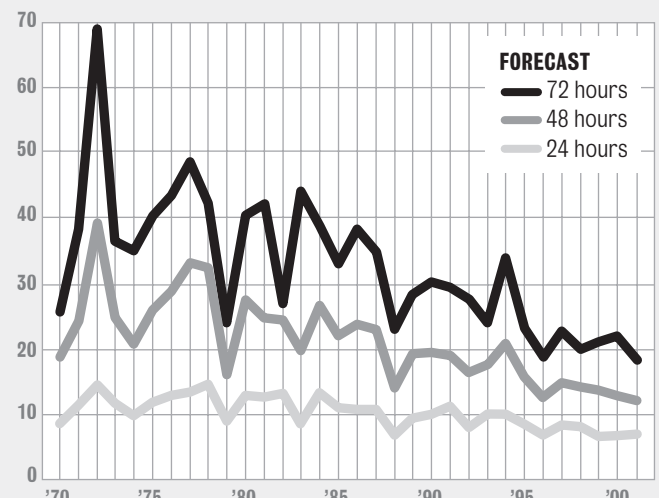


NOAA PHOTO

DOPPLER RADAR • In the 1970s, the National Severe Storms Laboratory installed its first Doppler weather radar in Norman, Okla. The radar system eventually evolved into a nationwide radar network. Weather radar devices emit radio signals that pass through fog and clouds but which are reflected by rain, snow and hail. By calculating the time it takes for the echo signal to return to the radar antenna, the location of the inclement weather as well as its speed and the direction it is traveling can be calculated.

BETTER PREDICTIONS

Errors in hurricane track forecasts have decreased dramatically over the past 30 years:



Source: National Hurricane Center

STAFF GRAPHIC



AP FILE PHOTO

In Bangladesh, a series of triangular-shape concrete shelters on stilts have been built in more than 1,000 locations. The shelters have been hugely successful in saving refugees during hurricanes that in generations past would have claimed untold thousands of lives.

Protection plans may alter N.O. irrevocably

PREVENTION, from A-1

gated sluices direct fresh river water across stretches of marshland, rebuilding it with silt. Dredges have hauled sand from miles offshore to sculpt and maintain new barrier islands where only slivers exist today.

► From New Orleans to Morgan City, thousands of homes have roofs fortified to resist high winds and are equipped

with steel storm shutters. Outside the levees, most homes have been raised on pilings 15 feet high or more. Main roads and highways are at similar heights.

► Some communities have built elevated shelters capable of withstanding 175-mph winds, similar to those being constructed in Bangladesh today.

► But big storms still threaten even this highly engineered landscape. In some places the Gulf of Mexico has maintained its steady progress inland and the region is starting to resemble Venice, Italy, the city of canals. Water routinely laps at the foot of levees, eroding them. In other areas, levees and walls defect surging floodwaters into new places and to surprising heights. Engineers watch as the sea rises and the land sinks and wonder whether their ambitious fixes will ultimately amount to nothing.

It's impossible to make a large city or a broad area like the Mississippi

River delta completely disasterproof. Nature is too fierce, human structures and activities too exposed. But most emergency managers agree that south Louisiana could be much safer than it is. That will take creative engineering design and new thinking about how to disasterproof communities. It also will take plenty of money.

These innovations are collectively more ambitious than any similar engineering project anywhere in the world and will change not only the shape of the Mississippi River delta but the way people live here. Some will end up behind walls. Some on stilts. If programs don't work, many people may ultimately move away.

"We have to think big. It's the only thing that will get us anywhere," said Len Bahr, the governor's executive assistant for coastal activities.

If erosion, subsidence and sea-level rise continue on their present course,

scientists say cities and towns will become man-made islands surrounded by rising Gulf waters and vulnerable to all manner of storms. That scenario strikes fear into the hearts of engineers and public officials. If water laps against levees and floodwalls, flooding becomes an almost daily threat.

Transportation and other normal activities can be easily disrupted by rising water. Just maintaining the levees becomes a complex task.

"We don't want to be in a situation where there are just levees and the Gulf," said Al Naomi, an Army Corps of Engineers project manager who is leading a preliminary study on whether to significantly increase levee protection across the area. "We want something between us and the Gulf."

Several large-scale efforts to avert this "waterworld" scenario and fortify the landscape are already under way, and more are proposed, some in

the realm of the fanciful and others merely ambitious.

The \$14 billion, 30-year Coast 2050 plan being pushed by a governor's committee and Louisiana members of Congress seeks to rebuild the coast, primarily by diverting water and silt from the Mississippi River across marshes and rebuilding barrier islands. Its promoters say it would begin to reverse some of the losses of the past 100 years and restore natural hurricane protections.

But at best, that would provide only partial protection from hurricanes. Even if the entire coast could be restored to the way it was a century ago, large storms could still devastate the area with flooding, rain, wind and tornadoes far inland. Scientists and engineers say additional fixes are needed. "We are not going to stop marsh loss. Subsidence is too dominant," said James Coleman, a professor of coastal

studies at Louisiana State University. Coastal restoration "is a temporary fix in terms of geological time. You will see results of massive coastal restorations in our lifetime, but in the long run they are also going to go."

Naomi is looking at whether to upgrade levee protection from Morgan City to the Mississippi border to withstand Category 4 and 5 hurricanes, which can have storm surges 30 feet high. Corps officials say most current federal hurricane levees protect up to the level of a fast-moving Category 3 storm.

Though building levees and floodwalls to any height is theoretically possible — "if we can build a 50-story building, we can build any kind of wall," Naomi said — any realistic proposal will involve complex trade-offs. Levees can be built only so high before they either take up too much space or begin to collapse, for example. The al-

ternative is to build more walls, but they are much more expensive and also heavier, meaning they would sink faster in relation to sea level.

High walls also are not especially attractive. "You talk about the levees in Jefferson Parish, they're 17 to 18 feet high," Naomi said. "If you put a wall on top of that, it could be something ugly. Do people really want that?" A more aesthetically appealing alternative — building a collapsible wall to some sections of the lakefront — would be still more expensive, he said.

Giant wall against water

A storm surge that tops the levees could flood the east bank to depths of more than 20 feet and take weeks to drain. Louisiana State University engineering professor Joseph Schuyday proposes building a wall that would cut across Orleans and Jefferson to create a refuge of last resort for resi-

dents. With its top reaching 30 feet above sea level, the wall would run from the foot of Esplanade Avenue to the Interstate 610 corridor, then west across parts of Jefferson Parish.

That would stop a flood coming in from the lake and create a "community haven" between the wall and the river levees where people left behind in a hurricane could retreat. It also would protect the Central Business District, the French Quarter and other areas from flood damage.

Corps engineers are looking at other approaches, too. "If we can find a way to keep storm surge away from those levees by attacking a surge farther out (in the Gulf) and making the levees a rear line of defense, we might not have to build them so high," Naomi said. "If you can slow the surge down, then you've accomplished something."

See PREVENTION, A-20

Coastal resuscitation

An ambitious 30-year plan would pump new life into south Louisiana's beleaguered coast and wetlands.

It may be the region's best hope for weathering major storms.

By Mark Schlieffstein
Staff writer

AFTER decades of division over who and what are most responsible for Louisiana's dissolving coastline, state officials, environmentalists, business leaders and scientists have found common ground on what they think it will take to fix the problem.

The often-combative factions are rallying around something called Coast 2050, a \$14 billion, 30-year wish list of flood-control, water-diversion and coastal-restoration programs that would be the largest construction project ever undertaken. The plan is aimed at re-creating a historic mix of swamp, marshland and barrier islands by unleashing some of the natural forces that had been bottled up by levees and other flood-control projects in the past century.

That should restore some of the region's natural storm protections, scientists say, reducing inland flooding and wind damage from tropical storms and weaker hurricanes that have become common events in south Louisiana in recent years.

"In the New Orleans area, if all the Coast 2050 strategies are implemented, you stand a pretty good chance of returning to a level of protection similar to 40 years ago," said Denise Reed, a professor of coastal geomorphology at the University of New Orleans.

But even with united local support, the scope of the proposal means the next phase of the battle will be fought over federal dollars in Congress, where the outcome is anything but assured.

The state would like to tap into the process Florida established in 2000 when it got congressional approval for an \$8 billion plan to restore fresh-water flow in the Everglades.

But Florida had several key advantages in the political arena, including 12 million more people and 16 more electoral votes in presidential elections than Louisiana. With a \$50 billion annual operating budget, Florida also expects to be able to contribute half the costs of the program. Louisiana, with a state budget of \$16 billion, would have a much harder time kicking in a substantial share.

Florida also sold its plan during times of budget surpluses and a soaring stock market, while Louisiana is lobbying in an era of deficits and during an expensive war on terrorism.

It's a struggle, but Louisiana leaders hope they can make a case for Coast 2050 based on the straightforward argument that the sinking landscape is a direct threat to people, commercial interests, the environment and the economy—including key fisheries and oil and gas production with national significance.

The battered coast and disappearing wetlands expose about 2 million south Louisiana residents, billions of dollars in property and key industries to increased flooding and damage from hurricanes, storms and even high tides. Officials fear the nation's energy flow could be disrupted if a hurricane takes out major pipelines or transfer facilities.

U.S. Rep. Billy Tauzin, R-Clackbay, says that should be reason enough for federal help.

"When you consider our contribution to national energy security, when we're finding out how risky it is to trust foreign sources of oil and gas, I'm not sure this is a bad time to make that argument," Tauzin said.

"If the nation continues to rely on Louisiana as the place for so much of the nation's energy requirements, the nation can't forsake our coastline at the same time," he said.

Tauzin, chairman of the House Energy and Commerce Committee,



STAFF PHOTO BY ELLIS LUCIA

recently asked a subcommittee to create a task force comprising high-ranking officials of a variety of federal departments to oversee the wetlands-restoration plan.

But Congress already has rejected legislation that would have provided the state with money to use as its share of the construction projects.

When Sen. Mary Landrieu, D-La., proposed her Conservation and Reinvestment Act in 1998 to divvy up offshore oil revenue among states directly affected by offshore production, Louisiana would have gotten the lion's share of the money. State officials made it clear they would use most of Louisiana's share as its match for coastal-restoration projects.

The House approved a version of the bill in 2001, but it died in the Senate. Instead, Congress approved a one-year, diluted version aimed largely at financing parks and recreation.

Meanwhile, Tauzin and other members of the congressional delegation have been focusing on reshaping Coast 2050 within the confines of the federal Water Resources Development Act, the vehicle used by Florida to authorize its Everglades-restoration efforts.

Projects included in the water bill are guaranteed a line in the president's budget each year, but not the actual dollars necessary to build them.

In 2004, after a broad-based environmental impact statement is complete, the delegation will return to request authorization for the entire plan. With the authorization in hand, members of the Louisiana delegation say, the fight over money for the federal share of individual projects will begin in earnest.

"If we're successful in obtaining federal authorization in 2004 and if the state can succeed in trying to find the additional revenue neces-

A coalition of scientists, business people and politicians have recommended taking steps toward creating a wide swath of wetlands and barrier islands that would be continually replenished with water and sediment from the Mississippi River. Here, the Corps of Engineers is working to repair Trinity Island, a barrier island in the Isles Dernieres chain.

that would intuitively understand the issues if we presented them to him properly, and would take them on," Milling said.

With urging from Milling, coalition officials and representatives of the Army Corps of Engineers, state Department of Natural Resources and his own Office of Coastal Activities, Foster convened a "coastal summit" in August 2001 at which he declared war on coastal erosion.

Foster tapped Milling to lead a task force to outline necessary changes in state law and the state's bureaucracy to better attack the problem. In February the task force adopted a report recommending that the state commit to spending between \$150 million and \$200 million a year on the restoration plan. Officials say they are probably a year from taking the spending request to the Legislature.

For a state with a questionable record of dealing with its environmental problems and a reputation for looking to the federal government to bail it out of financial jams, just the suggestion of that kind of commitment was seen as a seismic shift.

Officials are not yet able to quantify how much hurricane damage might be avoided by adopting the plan, but UNO's Reed is hopeful.

"Most marshes close to the Mississippi River stand the best chance of regaining their integrity from the Coast 2050 strategies," Reed said, because it will be easiest to funnel river water and sediment to them. "But it's going to be a decade or so before any are on the ground."

And there are some hurricane-protection issues that remain unresolved, such as the effects of erosion along the Mississippi River-Gulf Outlet, she said.

"It acts like a conduit for water movement straight to the city," Reed said. "The Coast 2050 strategy is to encourage re-evaluation of the waterway aimed at its closure. But closure wouldn't mean filling in the channel, only constricting its depth and width."

Houma and eastern Terrebonne Parish would not be so lucky, Reed said.

"The area between Bayou Lafourche and Houma is really suffering a lot of loss," she said. "These are marshes that are a long way from the Atchafalaya and Mississippi rivers" and will be difficult to rebuild.

"We have ideas and plans on how to get the land-building started again in that area, but the farther you are from rivers, the more difficult it is to make that happen," she said.

That's why construction of the proposed Morganza-to-the-Gulf hurricane-protection levee is important for communities in that area, she said.

'A national problem'

To help sell the rest of the nation on the importance of the coastal-restoration efforts, the state is embarking on a national education campaign aimed at convincing the public of the state's need for help.

Val Marmillion, a former aide to Breaux who is developing the campaign for the state Department of Natural Resources, already has gotten some encouraging news from small focus groups in Louisiana and Philadelphia aimed at narrowing the state's message.

The 15-person Louisiana focus group recognized the need for wetlands restoration but thought people outside the state would never support the dollars necessary to do the job.

But the Philadelphia group "seemed to think this is a national problem, without a doubt," Marmillion said. "And both groups shared the view that the federal government should assume the primary role in implementing the plan."

The focus groups also have helped Marmillion develop a brand name for the effort: "America's Wetland."

Mark Schlieffstein can be reached at (504) 826-3327 or mschlieffstein@timespicayune.com.

Planning is the key to surviving a hurricane. Have a destination in mind and make arrangements for your loved ones, pets and home. Then when a storm threatens, leave.

Ahead of the storm

By Mark Schlieffstein
Staff writer

NEW Orleans-area emergency officials have some simple advice for how to survive a catastrophic hurricane: Get out.

"At some point you have to accept some responsibility for helping yourself," said Deputy Fire Chief Terry Tullier, acting director of the New Orleans Office of Emergency Preparedness. "You have to understand that this could happen, and whether it's the second or third time you've been asked to evacuate this year ... you have to get up and go."

"The alternative is unacceptable," he said.

For Col. Jesse St. Amant, director of the Plaquemines Parish Office of Emergency Preparedness, that means: "Every person who fails to leave is going to be a search-and-rescue mission, either a casualty, injury or death."

That's because few buildings in the area are capable of withstanding the winds from even a relatively moderate storm. The New Orleans building code only requires houses to withstand winds of 100 mph, meaning that a strong Category 2 storm, with winds between 100 and 110 mph, would heavily damage or destroy most homes.

The Red Cross has decided that operating shelters south of the Interstate 10-Interstate 12 corridor is too dangerous. Recent studies by Louisiana State University engineering experts indicate that public refuges of last resort cannot be guaranteed to withstand winds from a major hurricane.

Heavy rains or storm surge can cause sudden flooding that cuts off escape routes and could leave people stranded on rooftops or in trees for days—if they survive the storm.

The time to map out your evacuation is now, not when a hurricane is threatening the city, said Kay Wilkins, executive director of the southeast Louisiana chapter of the American Red Cross.

"You want to plan now, because you need to be able to think out in advance where you're going to evacuate to without the pressure of a hurricane coming at you," Wilkins said.

Wilkins and others say these



STAFF FILE PHOTO BY TYRONE TURNER

STORM RESOURCES

For more information on hurricane preparedness:

► The American Red Cross, (504) 833-7556 or 1(800) 229-8191, www.redcross.org/services/disaster/keepsafe/ready/hurricane.html
► National Hurricane Center: www.nhc.noaa.gov

For information on flood insurance:

► National Flood Insurance Program, www.fema.gov/nfip/infocon.htm

factors need to be considered in an evacuation plan:

► Make sure your evacuation vehicle will survive what could be a slow trip to higher ground. Officials estimate that at the height of an evacuation, reaching a safe location could take four times as long as normal. That means it could take eight hours to reach Baton Rouge, 16 hours to get to Alexandria and 20 hours to reach Shreveport. Because of the additional congestion from a Mississippi Gulf Coast evacuation, reaching Jackson, Miss., could take as long as 24 hours.

► Have an out-of-state contact for family members to call in the event you are separated during the evacuation. Being outside the area affected by a hurricane, the contact will be more likely to be able to receive calls.

► Families with elderly, ill or disabled relatives should leave sooner to avoid extended travel

time and consult with doctors and caregivers to make sure medications and other special needs are addressed.

► Prepare a disaster supply kit that includes water, food, sleeping bags, a first-aid kit, flashlight, battery-powered radio and extra batteries.

► Important papers should be in the disaster kit, kept separately in a waterproof container. Documents to take during an evacuation include insurance policies, a property inventory of your home, birth certificates and passports, and an up-to-date list of medications family members are taking.

► Pet owners should make sure a place for their pets will be available. Red Cross-operated shelters in Louisiana don't allow pets, but most will have contacts with local veterinarians or kennels for evacuees to call when they arrive.

► Keep trees and shrubbery trimmed during hurricane season; make sure lawn furniture, trash cans, toys and other objects can be easily stored within a secure building; ensure that storm shutters are in good working order or that ½-inch plywood window coverings are cut before the first storm warnings are issued.

Now also is the time for people to make sure their homeowner's insurance coverage is in order, said Frank Pagano, a National Flood Insurance Program official.

Homes damaged by hurricanes can be covered by two separate insurance policies. One, a traditional homeowner's

Emergency preparedness experts recommend protecting window coverings with 58-inch plywood whenever a major storm is threatening. Here, Skip Bourdier nails a board to the side of Tutty Marlbrough's Grand Isle camp shortly before Hurricane Andrew's arrival in August 1992.

policy, pays for damage caused by wind or falling trees, and for water that leaks into a house from the roof. Most of those policies now require a deductible equivalent to 2 percent of the value of the home, unless a higher premium is paid.

A separate policy issued under the National Flood Insurance Program pays only for damage from floodwaters. That policy includes a \$500 deductible on damage to the building and a separate \$500 deductible on damage to a building's contents.

In the New Orleans area, officials say some homeowners have decided against buying flood insurance because their home isn't located in a mandatory flood insurance area.

That's not a good idea, said Ron Castleman, regional director of the Federal Emergency Management Agency. In the event of a catastrophic hurricane, which could put 20 feet of water even in areas protected by hurricane levees, homes without flood insurance will not be covered for water-related damage.

Mark Schlieffstein can be reached at (504) 826-3327 or mschlieffstein@timespicayune.com.

STORM PREPARATION

BEFORE THE STORM

► Plan an evacuation route. Contact your Office of Emergency Preparedness or Sheriff's Office for information.
► Have disaster supplies on hand, flashlights and extra batteries; first aid kit and manual; battery-operated radio and extra batteries; emergency food and water; non-electric can opener; essential medicines; cash; credit cards and sturdy shoes.
► Make arrangements for pets.
► Ensure that family members know how to respond after a hurricane.
► Teach children how and when to call 911, the police or fire department.
► Protect windows with shutters or ½-inch plywood.
► Trim back dead or weak branches from trees.
► Know the difference between a hurricane or tropical storm watch and a warning. According to the Federal Emergency Management Agency, a watch is issued when there is a threat from hurricane or tropical storm conditions within 24-36 hours. A warning is issued when hurricane or tropical storm conditions, high winds or dangerously high water and rough seas are expected in 24 hours or less.

DURING A STORM WATCH

► Listen to a battery-operated radio or television for progress reports.
► Check emergency supplies.
► Fuel car.
► Bring in outdoor objects such as lawn furniture and anchor down larger or heavier items.
► Secure buildings by closing and boarding up windows. Remove outside antennas.
► Turn refrigerator and freezer to coldest settings. Open only when necessary.
► Store drinking water in bottles, jugs and in a clean bathtub.
► Review evacuation plan.
► Moor boats securely or move it to a safe place. Use tie-downs or anchor to the ground.

DURING A WARNING

► Listen constantly to a battery-operated radio or television for official instructions.
► If in a mobile home, check tie-downs and evacuate immediately.
► Store valuables and personal papers in a waterproof container on the highest level of your home.
► Avoid elevators.
► If at home:
► Stay inside. Keep away from windows or glass doors.
► Keep a supply of flashlights and extra batteries handy. Avoid open flames such as candles.
► If power is lost, turn off major appliances to reduce power surge when electricity is restored.

IF YOU MUST EVACUATE

► Leave as soon as possible. Avoid flooded road and bridges.
► Unplug appliances and turn off electricity and the main water valve.
► Tell someone out of the storm area where you are going.
► Elevate furniture to protect it from flooding, if time permits.
► Bring preassembled emergency supplies and warm protective clothing.
► Take blankets and sleeping bags to shelter.
► Lock up home and leave.

FOCUS YOUR WEATHER EYE

For the latest tropical storm updates and emergency information:
nola.com/weather/hurricane
Read the entire Times-Picayune "Washing Away" series online: nola.com/hurricane



COAST 2050

The proposed \$14 billion Coast 2050 restoration plan includes a dozen general strategies that are being developed into specific projects along the state's coastline in the next 30 years:

► Diverting water from the Mississippi River. Sediment- and nutrient-rich river water would be used to build new wetlands in a number of areas, including Violet, Myrtle Grove, Fort Jackson, American Bay and Quarantine Bay. Another proposal is to build a channel parallel to Bayou Lafourche to funnel Mississippi River water into wetlands at the northern edges of Timbalier Bay.
► Managing the water flow from existing diversions, such as the Caernarvon and Davis Pond freshwater diversion projects, to maximize benefits to wetlands.
► Using offshore sand deposits and river sediment for rebuilding operations. Sand to rebuild the Isles Dernieres barrier island chain off Terrebonne Parish could be mined from Ship Shoal, about 10 miles offshore.
► Using sediment taken from the Mississippi and other rivers and bays during routine maintenance dredging to create, restore or protect wetlands and barrier islands. One such project is to build a sediment trap—a hole in the river bottom where sediment can drop out of the water—in the Mississippi River south of Venice and use the material to create marshes or restore barrier islands.
► Dedicated dredging. In areas such as Caminada Bay or Fourchon, sediment may be dredged to create new wetlands.
► Controlling nutria, which eat marsh plants to

their roots, one of the major causes of erosion.

► Stabilizing the erosion occurring on major navigation channels and other water bodies. One project would shore up the narrow band of wetlands separating Lake Borgne from the rapidly eroding Mississippi River-Gulf Outlet.

► Maintaining the shorelines along the Gulf of Mexico and in bays and lakes. Projects include rebuilding shorelines in lakes Manchac, Pontchartrain and Borgne. In some areas, this would include establishing new oyster reefs.

► Using water from drainage systems, such as West Bank pumping stations, to benefit interior wetlands. The rainwater runoff can help freshen areas

subject to saltwater intrusion and add nutrients needed by wetland grasses.

► Planting sea grass and wetland grasses to help restore more than 100 cuts in the Chandeleur Islands created by Hurricane Georges in 1998. The vegetation catches sand and also provides shelter for wildlife, including fish and shrimp.

► Maintaining, protecting or restoring coastal ridges. On the western side of the state, several projects would be aimed at restoring natural cheniers or ridges that run parallel to the coastline.

► Terracing. Several marsh-restoration programs would include the building of terraces of wetland plantings in open-water areas.

Coastal restoration no panacea, some say

PREVENTION, from A-17

For Orleans and Jefferson parishes, other east bank communities and parts of St. Tammany, the task would be to block storm-surge water from entering Lake Pontchartrain. One way to do that is to install gates along the Rigolets and Chef Menteur passes, something engineers have rejected in the past as too expensive and impractical. But the idea is worth examining, Naomi said. Given the high stakes — tens of thousands of people dead in a flood that tops the levees — Naomi said he would look for ways to account for the risk in the corps' cost-benefit analyses, which typically do not incorporate loss-of-life estimates.

If the past is any guide, not all of these experimental ideas will fly, and some of those that are tried may not work. Large-scale plans have many unforeseen small-scale effects that communities will have to wrestle with and seek more money to fix.

Grand Isle, for example, has at least a dozen separate programs designed to fortify it against erosion and flooding. But results have been mixed, and upgrading projects that have proved only partially effective is difficult.

In the 1970s the corps rebuilt beaches, installed rock breakwaters at intervals and built a levee to protect against beach erosion. But erosion has taken 300 to 400 feet of beach in the past decade, Mayor David Camardelle said. "Building the levee out of sand and putting it there is like putting sugar in coffee," he said. "It's gone."

Louisiana's plans to sculpt the Mississippi River delta to better withstand hurricanes may set new standards for coastal engineering. But on a smaller scale — the community and neighborhood level — the state lags behind others in up-

dating important policies, such as improved building standards, better evacuation routes and controlling development in floodprone areas.

Gambling big on FEMA aid

The megadisasters of the past decade have caused emergency managers across the country to reassess their programs, which traditionally stress postdisaster response. In the wake of recent megadisasters — Hurricane Andrew in 1992, the 1994 Northridge, Calif., earthquake and the Sept. 11 terrorist attacks — many officials are now focused more on preventive measures to reduce damage and save lives.

"There is a huge shift among local and community leaders, and I think among average citizens," Federal Emergency Management Agency director Joe Allbaugh said. "The American public is paying more attention to the possibility of disasters happening, especially since 9/11. But we've got to do more."

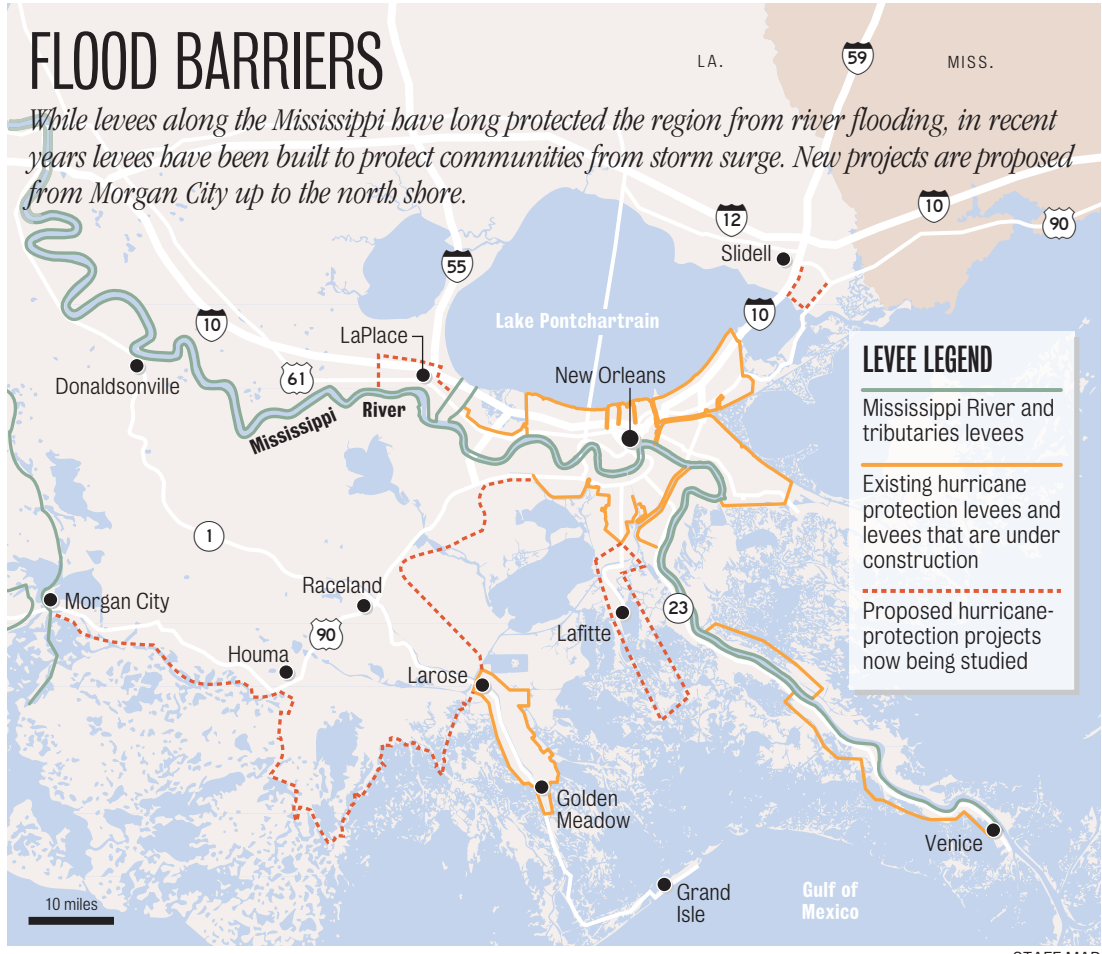
Even in high-risk areas, home and business owners, local officials and those who run key facilities such as hospitals often do little to fortify their property against floods, winds or wildfires — perhaps with the expectation that federal programs will put everything back together should disaster strike. But government aid is at best a patchwork, and FEMA and other agencies have been making the rules more restrictive and monitoring their money more closely.

"It's wrong; it's just not true. The greatest fallacy perpetrated by media and politicians is that FEMA will make you whole," said Mary Comerio, a professor of architecture at the University of California, Berkeley, and author of a book on disaster recovery. Though the government provides substantial financial aid and other assistance, many homes are never rebuilt and many businesses never recover from a catastrophic event, she said.

North Carolina is one state that has pioneered "disaster-resistant" policies. After Hurricane Floyd devastated thousands of square miles of the state with flooding in 1999, Gov. Jim Hunt and state officials decided to make disaster issues a top priority. They added \$836 million in state money to \$1.3 billion in fed-

FLOOD BARRIERS

While levees along the Mississippi have long protected the region from river flooding, in recent years levees have been built to protect communities from storm surge. New projects are proposed from Morgan City up to the north shore.



eral money for a comprehensive program that includes disaster-proofing for communities and homes, up-to-date flood plain mapping and other programs.

"You can reduce the risk from almost any natural hazard," said Gavin Smith, director of North Carolina's new hazard-mitigation program. "You can move structures away from the hazard or you can protect them in place. For example, there's armoring a structure against high winds. For us, it's not just about hurricanes and flooding. We have an earthquake threat in western North Carolina, so we are spending funds to retrofit schools."

North Carolina's Tar River overflowed during Floyd, putting entire neighborhoods under water. Officials there have used the state programs to launch an aggressive buyout program to move people out of the 100-year flood plain where the worst flooding occurred.

Once they are bought out and cleared, some areas will be turned into a waterfront park. Because most of south Louisiana is a flood plain, emer-

gency managers say massive buyouts are impractical but that targeted buyouts in areas that flood frequently might work. FEMA already offers these on a limited basis.

Castles made of sand

Some observers say the recent explosion of vacation homes and fishing camps in coastal areas including Grand Isle, Cocodrie and parts of St. Bernard and Plaquemines parishes is foolhardy. Though new structures are elevated, they still can be destroyed by winds, waves and moving debris in a hurricane.

"It's crazy to build in some of these areas," said University of New Orleans coastal geologist Shea Penland. "Many of those structures just won't survive."

Some North Carolina community leaders found buyouts unthinkable. Belhaven, N.C., which sits in low-lying swamp three feet above sea level, had six storm-surge floods in three years, culminating with Floyd. The local elementary and junior high schools had to be torn down

and rebuilt on higher ground.

"You can either have Belhaven in the 100-year flood plain or not have Belhaven at all," Town Manager Tim Johnson said. "So the alternative was to elevate."

The town pooled \$16 million in FEMA and state grants to raise more than 300 of the town's 962 homes either 8 or 9 feet above the ground, the biggest single elevation project in the nation. On any given day, several homes in town are being raised or moved. On one street, workers gently position four steel girders under a home as they prepare to lift it. In a local community center, contractors walk new participants through the process.

Like most places, Louisiana has no proactive program to raise vulnerable homes. To qualify for favorable federal flood insurance rates, new homes must be built above the 100-year flood level, which approaches 10 feet in some places. Some new homes are 15 feet off the ground. If a flood damages a home and the owner wants to rebuild, money is available to raise the structure.

But owners of existing homes usually must bear the cost of raising the structure above the flood level.

In Bangladesh, where catastrophic hurricanes accompanied by 20-foot storm surges in 1970 and 1991 took 300,000 and 138,000 lives, respectively, a consortium of world charities began building triangular-shape concrete shelters on stilts in more than 1,000 locations. The shelters have been hugely successful in saving thousands of lives during recent hurricanes, officials say.

Louisiana emergency preparedness officials hope to persuade the Legislature to adopt a similar plan: requiring all new public buildings in the coastal zone to be built to withstand catastrophic storms so they can be used as shelters.

On an even smaller scale, individuals can invest more in disaster-proofing their homes. A few thousand dollars will buy clips to keep a roof from flying off a home and steel shutters that will prevent hurricane-force winds from blasting through the house.

Some disaster specialists say the same philosophy holds not just for homes but for all buildings in risky areas, and that developers and local officials should start thinking about disaster every time they draw a blueprint.

"Say New Orleans needs a new hospital," said Dennis Mileti, a sociologist who directs the University of Colorado's Natural Hazards Research and Applications Information Center. "Say the worst possible flooding is five stories high. So you put the garage on the lower floors and put everything above the fifth floor. Why build an essential facility like a hospital on the ground when you know it might flood? It might be wise to do it for schools, hospitals, and other essential facilities. Maybe it's not prudent to tear them down today and rebuild them. But in America we tear stuff down and rebuild it all the time."

John McQuaid can be reached at (202) 383-7889 or john.mcquaid@newhouse.com.

Mark Schiefelstein can be reached at (504) 826-3327 or mschiefelstein@timespicayune.com.